

## CRUISE REPORT FROM R/V ARGOS

**Survey period:** 2002-08-26 - 2002-08-31

**Survey area:** The Skagerrak, the Kattegat, the Sound, and the Baltic Proper

**Principal:** SMHI

### SUMMARY

*The expedition was performed within SMHI's regular marine monitoring programme and covered the Skagerrak, the Kattegat, the Sound and the Baltic Proper.*

*Surface temperatures were 3 to 5 °C higher than normal in all areas.*

*All nutrients showed, for the season, normal values, with the exception of silicate that showed enhanced concentrations in the eastern Skagerrak and the northern Kattegat.*

*Oxygen concentrations below 2 ml/l were detected in the bottom water in the southern Kattegat and at depths greater than 10 metres at W Landskrona in the Sound.*

*Oxygen concentrations below 2 ml/l were found at depths greater than 70 to 80 metres in the whole Baltic Proper, in the Arkona Basin from 30-40 meters. Hydrogen sulphide was present at depths greater than 125 metres in the eastern Gotland Basin and at the Norrköping Deep, from 100 metres at the Karlsö Deep and from 80 metres in the Bornholm Basin and in the Hanö Bight.*

## **PRELIMINARY RESULTS**

The cruise, part of the SMHI ordinary monitoring programme, began in Göteborg on August 26 and ended in the same port August 31. During the main part of the expedition the weather was very warm and calm. During the last day of the expedition there was a gale from the southwest.

Sampling for the EU-project HABILE was carried out at Fladen, Anholt E and at BY5.

### **The Skagerrak**

The surface water temperatures varied between 20 and 22°C, about 4 to 5 degrees higher than normal. The thermocline was located at a depth of ca. 10 meters. The halocline was found at a depth of 5 to 15 metres, deepest at the Swedish coast, where the surface salinity was extremely low.

Silicate in the surface layer showed enhanced concentrations, 3-5  $\mu\text{mol/l}$  at the stations P2 and Å13 along the coast. Otherwise nutrient concentrations were normal for the season. Phosphate concentrations were 0.03-0.15  $\mu\text{mol/l}$ , nitrate below detection limit (0.10  $\mu\text{mol/l}$ ) and silicate from 0.2 to 0.7  $\mu\text{mol/l}$ . Oxygen saturation in the surface layer varied between 105 and 112%.

### **The Kattegat and the Sound**

Surface water temperatures varied between 20.5 and 21.5°C, about three degrees above normal. The thermocline and halocline was located at a depth of 5-10 metres and as in Skagerrak, surface salinity was unusually low.

Nutrient concentrations in the Kattegat surface water were normal for the season, with the exception of silicate that showed higher than normal values at Fladen in the northern part.

Phosphate concentrations varied between 0.05 and 0.10  $\mu\text{mol/l}$ , nitrate below detection limit (0.1  $\mu\text{mol/l}$ ) and silicate around 1  $\mu\text{mol/l}$ . In the Sound, the concentrations were higher, phosphate 0.26  $\mu\text{mol/l}$ , nitrate 0.15  $\mu\text{mol/l}$  and silicate 11  $\mu\text{mol/l}$ .

Oxygen saturation in the surface water in the Sound was 115 %, while it was about 105% in the Kattegat. Oxygen concentrations in the bottom water in the southern Kattegat and the Sound were low, below 2 ml/l with the lowest value, 1.31 ml/l at Anholt E. In the Sound, oxygen values below 2 ml/l was found already at a depth of 15 metres.

### **The Baltic Sea**

Surface water temperatures varied between 20 and 23°C, which is 3 to 4 degrees above normal. The thermocline was found at a depth of 10-15 metres. The halocline was found at a depth of 20-30 metres in the Arkona Basin, at 50-60 metres in the southern Baltic and at 60-70 metres in eastern and western Gotland Basins.

Nutrient concentrations were mostly normal for the season; phosphate varied between 0.03 and 0.2  $\mu\text{mol/l}$ , silicate between 7 and 11  $\mu\text{mol/l}$ , both parameters showed the highest values in the south. Nitrate concentrations were below detection limit (0.10  $\mu\text{mol/l}$ ) in the whole area. Oxygen saturation in the surface layer was between 104 and 115%.

Surface accumulations of algae were present in the Arkona Basin, in parts of the Bornholm Basin and in patches east and north of Gotland.

The oxygen situation in the deep waters of the Baltic Proper is still very bad. Oxygen concentrations below 2 ml/l were found at depths from 70-90 metres in the whole area, in the Arkona Basin already at depths from 30-40 metres. Hydrogen sulphide was found at depths exceeding 80 metres in the Bornholm Basin and the Hanö Bight, from 90 metres at the Karlsö Deep, from 125 at the Norrköping Deep and the Eastern Gotland Basin.

## **PARTICIPANTS**

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## **APPENDICES**

- Track chart
- Table over stations, parameters and sampling depths
- Map showing bottom oxygen concentrations
- Monthly average plots for selected stations
- Profiles for selected stations